AMENDMENTS TO THE CLAIMS

Presented below is a complete set of claims with current status indicators.

1. (previously presented) In an implantable medical device for implant within a patient, a method comprising:

receiving electrical cardiac signals having a series of cycles, each cycle including a ventricular repolarization followed by a ventricular depolarization;

identifying segments of the cardiac signals subsequent to a ventricular repolarization and prior to the ventricular depolarization following the ventricular repolarization; and

detecting cardiac ischemia based on an examination of the identified segments, the examination comprising deriving energy values for the identified segments.

2. (original) The method of claim 1 wherein detecting the cardiac ischemia is performed to detect cardiac ischemia so as to predict a subsequent acute myocardial infarction (AMI).

3. (previously presented) In an implantable medical device for implant within a patient, a method comprising:

receiving electrical cardiac signals having a series of cycles, each cycle including a ventricular repolarization followed by a ventricular depolarization;

identifying segments of the cardiac signals subsequent to a ventricular repolarization and prior to the ventricular depolarization following the ventricular repolarization; and

detecting cardiac ischemia based on an examination of the identified segments; the examination comprising detecting a sharp falling edge within electrical cardiac signals within the identified segments.

4. (previously presented) The method of claim 3 wherein detecting the sharp falling edge comprises:

filtering the cardiac signals to yield a high-pass filtered signal;

deriving an energy value representative of a total amount of energy in the filtered signal within each identified segment;

deriving a running average of the energy value;

inputting first and second threshold values; and

detecting the sharp falling edge based on a comparison of the energy value, the running average, and the first and second thresholds.

5. (original) The method of claim 4 wherein filtering the cardiac signals comprises:

routing the cardiac signals through a high-pass filter having a cutoff frequency in the range of 0.1 to 5.0 Hz.

6. (original) The method of claim 4 wherein filtering the cardiac signals comprises:

routing the cardiac signals through a high-pass filter having a cutoff frequency of at least 1 Hz.

7. (previously presented) The method of claim 4 wherein deriving the energy value comprises calculating:

$$E_{PostT} = \sum_{k=Tstart}^{Tend} s(k)$$

for each identified segment, wherein s(k) is a digitized version of the filtered cardiac signal, T_{start} and T_{end} are start and end points, respectively, of the identified segment, and k represents individual samples of the digitized signal.

8. (original) The method of claim 7 further comprising initially calculating T_{start} and T_{end} by:

identifying a pair of consecutive ventricular depolarizations (S1 and S2) within the cardiac signals;

determining a time interval (S_to_S_Interval) between S1 and S2;

setting T_{start} equal to S1 + S_to_S_Interval / 4; and

setting T_{end} equal to S2 - S_to_S_Interval / 4.

9. (original) The method of claim 7 wherein deriving the running average comprises calculating:

$$E_{PostT\_Ave}(i) = \alpha \cdot E_{PostT\_Ave}(i-1) + (1-\alpha) \cdot E_{PostT}$$

at time increment "i" where α is a predetermined value and wherein $E_{PostT\_Ave}(0)$ is set to a default value.

10. (original) The method of claim 9 wherein α is equal to 15/16.

11. (original) The method of claim 4 wherein detecting the sharp falling edge based on a comparison of the energy value, the running average, and the first and second thresholds comprises:

determining whether either an absolute value of the energy integral minus the running average exceeds the first threshold or an absolute value of just the running average exceeds the second threshold for a predetermined number of heart beats; and

if so, generating a signal indicative of the onset of ischemia.

12. (previously presented) The method of claim 11 further comprising detecting the end of the episode of ischemia by:

determining whether both absolute value of the energy integral minus the running average falls below the first threshold and the absolute value of just the running average falls below the second threshold for a predetermined number of heart beats; and

if so, generating a signal indicative of the end of the episode of ischemia.

13. (original) The method of claim 1 further comprising:

generating a warning signal indicative of the ischemia.

14. (original) The method of claim 13 wherein generating a warning signal indicative of the ischemia comprises:

applying a perceptible electrical notification signal to subcutaneous tissue.

15. (original) The method of claim 13 wherein generating a warning signal indicative of the ischemia comprises:

transmitting a notification signal to a warning device external to the patient.

16. (previously presented) In an implantable medical device for implant within a patient, a method comprising:

receiving electrical cardiac signals having a series of cycles, each cycle including a ventricular repolarization followed by a ventricular depolarization;

filtering the cardiac signals to yield a band-pass filtered signal;

deriving energy values representative of a total amount of energy within portions of the filtered signals subsequent to a ventricular repolarization and prior to the ventricular depolarization following the ventricular repolarization; and

detecting cardiac ischemia based on a comparison of the energy values against threshold values.

17. (previously presented) In an implantable medical device for implant within a patient, a method comprising:

detecting cardiac ischemia by deriving energy values of portions of electrical cardiac signals, wherein the electrical cardiac signals have a series of cycles, each cycle including a ventricular repolarization followed by a ventricular depolarization, and the portions of the cardiac signals are subsequent to a ventricular repolarization and prior to the ventricular depolarization following the ventricular repolarization; and

if cardiac ischemia is detected, generating a perceptible warning signal to alert the patient.

18. (previously presented) In an implantable medical device for implant within a patient, a system comprising:

a sensing circuit operative to receive electrical cardiac signals having a series of cycles, each cycle including a ventricular repolarization followed by a ventricular depolarization, and to identify segments of the cardiac signals subsequent to a ventricular repolarization and prior to the ventricular depolarization following the ventricular repolarization; and

a cardiac ischemia detector operative to detect cardiac ischemia by deriving energy values of the identified segments.

19. (previously presented) In an implantable medical device for implant within a patient, a method comprising:

a sensing system operative to receive electrical cardiac signals having a series of cycles, each cycle including a ventricular repolarization followed by a ventricular depolarization, and to identify segments of the cardiac signals subsequent to a ventricular repolarization and prior to the ventricular depolarization following the ventricular repolarization;

a bandpass filter operative to filter the identified segments to yield a band-pass filtered signal;

a filtered signal integration unit operative to determine energy values representative of a total amount of energy within portions of the filtered signals; and

a threshold comparison unit operative to compare the energy values against threshold values indicative of cardiac ischemia; and

a cardiac ischemia warning system operative to output a signal indicative of the ischemia.

20. (currently amended) In an implantable medical device for implant within a patient, a system comprising:

means for receiving electrical cardiac signals having a series of cycles, each cycle including a ventricular repolarization followed by a ventricular depolarization;

means for filtering the cardiac signals to yield a band-pass filtered signal;

means for deriving energy values representative of a total amount of energy within portions of the band-pass filtered signals subsequent to a ventricular repolarization and prior to the ventricular depolarization following the ventricular repolarization;

means for detecting cardiac ischemia based on a comparison of the energy values against threshold values; and

means for generating a warning signal indicative of cardiac ischemia.